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Major General Schley was Commander of the 307th regiment of Engineers in World War I; Commandant of the Engineer School of the U. S. Army at Fort Belvoir, Virginia; Engineer of Maintenance of the Panama Canal from 1928 to 1932; Governor of the Panama Canal Zone from 1932 to 1936; and Chief of Engineers of the U. S. Army from 1937 to 1941. He has traveled extensively by land and air thruout Latin America and is an authority on the problems of transportation and communication in the American Republics.

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Miss Forsyth is Assistant Professor in the Department of Social Studies, New York State College for Teachers at Albany. This is the last in a series of nine lessons on map reading, designed for junior high school level. Have you tried out these lessons with your students? Please tell us whether you have been successful in using them. What are the merits and demerits of the lessons?

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VOLUME XLIII MAY, 1944 NUMBER 5

OCEAN-TO-AMAZON HIGHWAY

MAJOR GENERAL JULIAN L. SCHLEY

An outstanding wartime accomplishment of the Republic of Peru and an important contribution to the Allied war effort is the completion of the strategic ocean-to-Amazon highway which now connects Peru's Pacific-coast ports with the upper Amazon Valley. This valley is today the western hemisphere's source of natural rubber, barbasco, and other strategic materials.

"The completion of the Lima-Pucallpa highway uniting Lima, the capital of Peru, with Iquitos, the capital of our great eastern frontier region, thereby closing the final link in the chain of land and water communication between the Atlantic and the Pacific Ocean, marks an historic epoch in the economic development of our nation and of the entire Amazon Valley," said Manuel Prado, President of Peru, at the recent official opening of this highway.

The trip from Lima to Iquitos now takes only 5 days—two by motor car on this highway and 3 by river steamer—and costs about $17. Previous to the completion of this 522-mile highway, the 30-day overland trip by mule and by canoes between these two cities was so arduous that many travelers preferred to go the long way round by steamer—up to the Panama Canal, around northern South America to the mouth of the Amazon and up the Amazon to Iquitos, a total distance of over 5,000 miles.

DARING PIECE OF ENGINEERING

The first section of the Lima-Pucallpa highway, that from Lima to the central plateau, is known as the Central Highway and has been completed for several years. It is asphalted for 116 miles, or as far as Oroya.

This Central Highway is one of the most daring pieces of highway engineering in the world, for, in the first 87 miles of its length, it climbs thru a series of canyons, unbelievably narrow and

steep, and crosses the Anticona pass at 4,843 meters or almost 16,000 feet above sea level. At one point the road climbs in a spiral crossing itself twice by bridge in a great figure-8 loop, the only loop of this kind in America.

At the top of the pass the road is over a thousand feet higher than Mont Blanco, the highest mountain in Europe, higher even than Mount Whitney, the highest peak in the U. S. Rockies. Here it is cold, and the air is very thin. The highway then continues at an average elevation of over 13,000 feet until Cerro de Pasco is passed. It then dips into and out of a series of lower valleys.

An over-night stop is usually made at the picturesque town of Huanuco, 260 miles from Lima and 6,600 feet above sea level. Here the Government has built a modern hotel with accommodations for 62 guests.

Tingo Maria's Advance

Continuing eastward from Huanuco the highway crosses some of the lesser ranges of the eastern Andes and drops down into the tropical valley of the Huallaga River and to the frontier town of Tingo Maria. A few years ago this was only a collection of thatched huts marking the end of the trail. Today it is on its way to becoming an important town.

Tingo Maria now has a new hotel with accommodations for 48 guests; a new and up-to-date tropical hospital with 40 beds; a Government agricultural experiment station, with buildings costing $160,000; quarters for various Government officials and administrative officers; a modern school, two sawmills, warehouses and stores, and an active traffic on the Huallaga River.

United States technicians have joined with Peruvian experts in establishing the agricultural experiment station at Tingo Maria. Among other products, this station is interesting itself in the production of quinine, kapok, quinoa, and barbasco, all of which are native to the region, as well as tea, jute and abaca from which is obtained manila hemp fiber.

Data from Distant Past

Beyond Tingo Maria the highway almost loses itself in the heavily forested ridges of the Blue Mountains. Here enters one of the most romantic episodes in its construction.

The problem was how to get out of a valley 2,200 feet above

sea level, over a range 7,000 feet high and down to the River Ucayali. No pass thru the mountains could be found.

Someone then remembered that, in past centuries, the Franciscan missionaries had explored much of this country in their efforts to convert the Indians. How did they get thru? The engineers dashed back to the dusty church archives in Lima where they studied old diaries and musty, faded field notes of those hardy men of the brown robes who were explorers as well as missionaries.

Then, in the spring of 1937, engineer Federico Basadre found the long-forgotten records of the Franciscan missionary Fray Alonso Abad, which covered twelve closely written manuscript volumes. Here was a record of a long and exhausting search thru the dark and uninhabited jungle for a break in the Blue Range and a way thru to the Amazon—but let the record speak for itself:

"In the spring of 1757," says this old diary, "we organized a new expedition, leaving the Indian village of Cuchero on May 4 with 17 Indians and arriving on May 15 at Tulumay, and following the directions of a previous expedition, we discovered, on the 25th day of May, the 'Paraja' where a passage seemed to open in the broken country which led to a gorge or canyon leading in the direction of the forest-covered Pampas of Sacramento (or Amazon low-lands)." The reader must remember that this little band was groping its way thru an almost impenetrable tropical jungle.

On July 22, 1937, Engineer Basadre, following the exact directions written nearly 200 years before, found the same canyon which the Yuracyacu River had cut in an easterly direction thru the Blue Range. No other person had been thru this gorge in nearly two centuries, for this part of Peru is uninhabited. This Boqueron, or canyon, which has been named after Padro Abad, is a deep narrow transverse crack thru this range, brought about by some gigantic seismic disturbance of the past. This crack is a little less than three miles long, not over 300 feet wide in places, and 6,000 feet deep. The bed of the gorge is 1,400 feet above sea level. Three tunnels and three bridges were required to get the road thru beside the river.

On the Ucayali

Leaving the Boqueron, the road crosses the River Aguaytia where a bridge 2,560 feet long is yet to be installed. The crossing

is now affected by a ferry, and the road continues across the forested lowlands to Pucallpa on the River Ucayali, a tributary of the Amazon.

Pucallpa, only a frontier village five years ago, now bids fair to become the metropolis of eastern Peru. It already has an airport, a hospital, a school and other modern buildings. River steamers towing barges now ply between Pucallpa and Iquitos, a distance of some 650 miles—the trip takes three days and ocean steamers up to 6,000 tons come up the Amazon as far as Iquitos, 2,300 miles from the Atlantic.

Traffic Moves Faster

The opening of this new route is of great strategic importance, apart from its economic value. It is already described as a vital auxiliary of the Pan American Highway system.

A regular overland mail and parcel-post service between Lima and Iquitos has been established. The first mail truck left Lima on the morning of September 8, 1943, and according to newspaper reports, made the 522-mile run to Pucallpa in 14 hours and 20 minutes, or an average of better than 37 miles an hour.

At Pucallpa the mail is placed on board a river steamer for the three-day 650-mile run to Iquitos. Passenger busses make the run between Lima and Pucallpa in two days with an overnight stop at Huanuco. A transportation company has been organized to handle shipments of merchandise between Lima and Iquitos.

The wartime completion of this highway, which was begun several years ago, is credited to the driving force of Don Carlos Moreyra y Paz Soldano, Peru's dynamic Minister of Public Works and Development, who has made this task a No. 1 objective of his administration.

Region's Resources

This Amazon Valley region is rich in rubber. With the aid of United States credits there has been established a Peruvian Amazon Corporation, which will develop other tropical products of strategic importance, such as barbasco and jute.

A most significant phase in the development of this new region, and one which has been largely overlooked in the press of world affairs, was the discovery of oil, some six years ago, at a point about 50 miles upstream from Pucallpa on the Pachitea River and

only about 20 miles from the line of the present new highway. So far as is known, this is the only dependable supply of petroleum in the Amazon Valley.

A small topping plant has been installed here at the Blue Goose wells and is now supplying gasoline and oil at the rate of 2,000 barrels a month for the river transport from the upper Amazon Valley to the city of Iquitos and to nearby Brazil. Shipment is being made in drums.

While Peru's Amazon Valley area—equal to two-thirds the total area of the nation—is short on highways, it is abundantly supplied with waterways. There are said to be no less than 22,000 miles of navigable river channels in its nine great rivers and their tributaries. For this reason eastern Peru needs motor boats more than motor cars. At least 5,000 motor-powered vessels of various types and sizes will be required, it is estimated, to serve this region where scarcely a hundred motor-powered vessels are operating today.

HIGHWAYS OF PENETRATION

The "highways of penetration," aimed to connect Peru's coastal and plateau regions with the Oriente, or the Amazonian Basin, are (1) the Pucallpa Highway just described, (2) the Olmus-Maranon Highway in the north, now well under way, (3) the Urcos-Marcopata-Madre de Dios Highway, and (4) the Huambutio-Paucartambo-Madre de Dios Highway. The last two are in the Department of Madre de Dios and branch off to the east from the two named stations on the Cuzco-Puno railroad. Other highways of penetration are being considered, but work on them has not yet begun.

The Olmus-Porculla-Rio Maranon route, Peru's northern highway of penetration, named "Ruta Mesones Moro" after its explorer and discoverer, starts from the city of Olmos on the Pan American Highway in the Department of Cajamarca, 536 miles north of Lima.

It crosses the main range of the Andes at the Porculla Pass, 7,072 feet above sea level—the lowest pass across the main Andes in all Peru. This road follows the Quebrada de Tierras Negras and Huallapampa as far as the River Huancabamba, 49 miles from Olmos. From this point it follows the left bank of the Huancabamba as far as its outlet in the Maranon River, terminating at

the town of Bellavista, 143 miles from Olmos, and opening up magnificent agricultural territory between Jaen and Bellavista at elevations averaging 2,000 feet above sea level.

This highway, a later extension of which will be carried 65 miles to the Pongo de Manseriche, the famous gorge in the upper Maranon, is now open for normal traffic for a distance of more than 60 miles from Olmos, and preliminary engineering work has been carried much farther.

It is hoped that by the end of the present year traffic will be opened as far as Bellavista, when work will be immediately inaugurated on the 65 mile extension to the Pongo de Manseriche. An aerial photographic survey of this extension has been made.

The Maranon is navigable both above and below the seven-mile gorge or "Pongo" which is full of rapids. From Iquitos to the Pongo, some 450 miles, it is navigable by steamers drawing up to six feet of water, and above the rapids by smaller craft drawing two feet of water.

The Urcos Highway drops down rapidly from the plateau, near Cuzco, 12,000 feet above sea level. Then it traverses the valley of the Marcapato River thru Quince Mill, a community with an airport and supply base for the hundreds of gold miners of that region, past Palcamayo to the Nusiniscato River, 190 miles from Urcos. Plans call for it to be extended 30 miles farther to the Inambari, an affluent of the Madre de Dios River. Rubber is now being brought out from the Madre de Dios by pack train, to the end of this new highway.

The Huambutio Highway branches off from the railroad station of that name a little to the north of Urcos, leads down into the valley of the upper Madre de Dios via Paucartambo, thru the 15 mile canyon of the Yanamayo River, then down the River Pilcopata and eventually to the River Carbon near Itahuania, a total of 162 miles, more than half of which is now constructed.

Exploration parties have reported large coal deposits, oil seeps, sulfur hot springs, signs of gold and lots of rubber trees in the region beyond the end of this highway.

Other highways, not yet begun but scheduled for future construction include the route from Satipo to the Perene Valley and eventually to the River Ucayali; from Tambo to the Apurimac River; from Cuyu-cuyu to Sandia and the rich gold regions thereabout; and from San Luis de Shuaro, via Oxapampa to the Pozuzu and Pachitea rivers.

In 1927 Peru had only 7,500 miles of good highways; today the mileage of good roads exceeds 15,700

The Pan American Highway runs for 1,761 miles thru the length of Peru; nearly all of this is completed, and nearly 90 per cent is either hard-surfaced or asphalted.

RAILROADS AND SHIPPING

There has been virtually no railway progress in Peru during the last 15 years, because of the late depression, the high cost of building railroads, and the idea that they would gradually be displaced by motor transportation.

This last idea has been dispelled by the events of the war, and it is recognized that roads and railroads are complementary. The possibility of electrification of railroads has been considered. In February of this year the Peruvian Government appointed a commission of engineers to develop an integrated plan for extension and improvement of the railroads. Cable railways also are of importance in Peru for the transportation of minerals.

The total maritime coastwise traffic of Peru ran to about 2,250,000 tons a year between 1937 and 1941 and has not grown since, in consequence of wartime shipping scarcities. At the completion of the four great interior highways, river shipping will undoubtedly become of great importance from the navigable harbors of the Maranon, the Ucayali, and the Madre de Dios rivers.

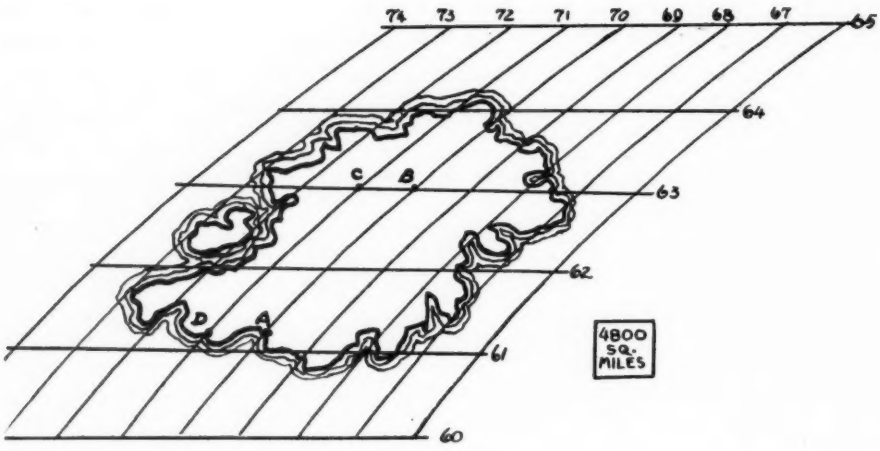
MAP READING: TESTING SKILLS

Elaine Forsyth
Ithaca, New York

Test of Map-Reading Skills

Study Map A carefully as you answer each question. Write your answers neatly on the space provided after each question.

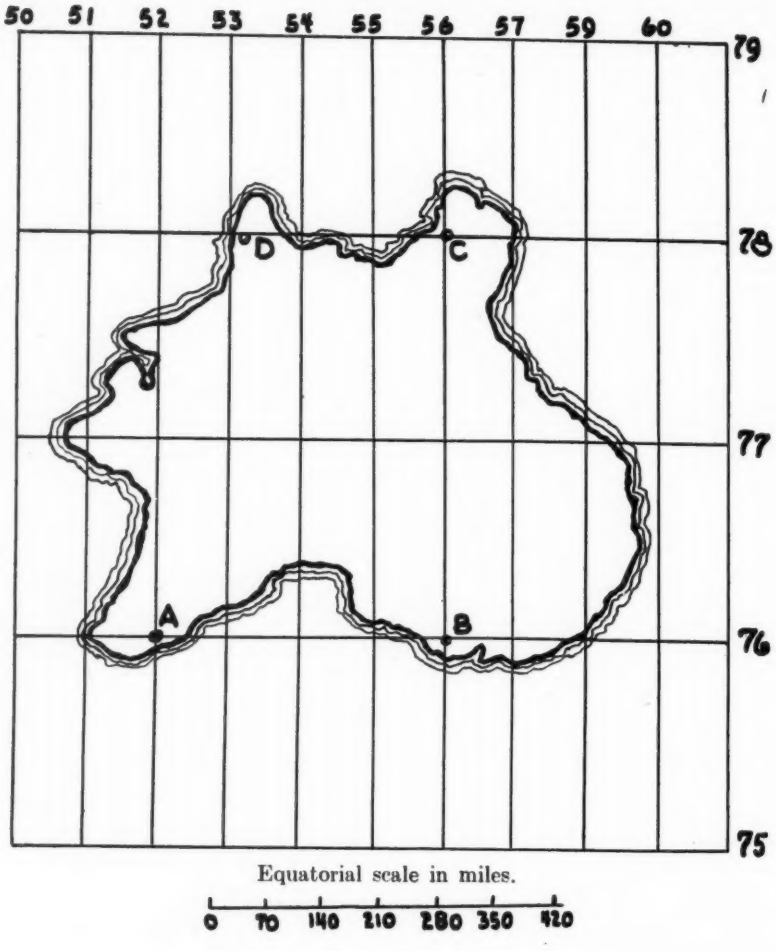
MAP A



Map A

1. What direction is C from D? _____
2. What direction is B from A? _____
3. Which city is closest to the South Pole A, B or C? _____
4. What is the approximate distance in miles from C to D? _____
5. At its longest point the island is about how long? _____
6. Is this island east or west of Greenwich? _____
7. Is this island north or south of the equator? _____
8. Is this island in the high, middle or low latitudes? _____
9. Of what use is the little square under the scale of miles? _____
10. Give the latitude and longitude of D. _____
11. In this map is the distortion largely of area, shape or direction? _____
12. At 60° a degree of longitude is about 35 miles. How far is A from D by air? _____
13. Of the maps you have studied which one does Map A resemble most? _____

MAP B



Write your answers neatly in the space provided after the question.

Map B

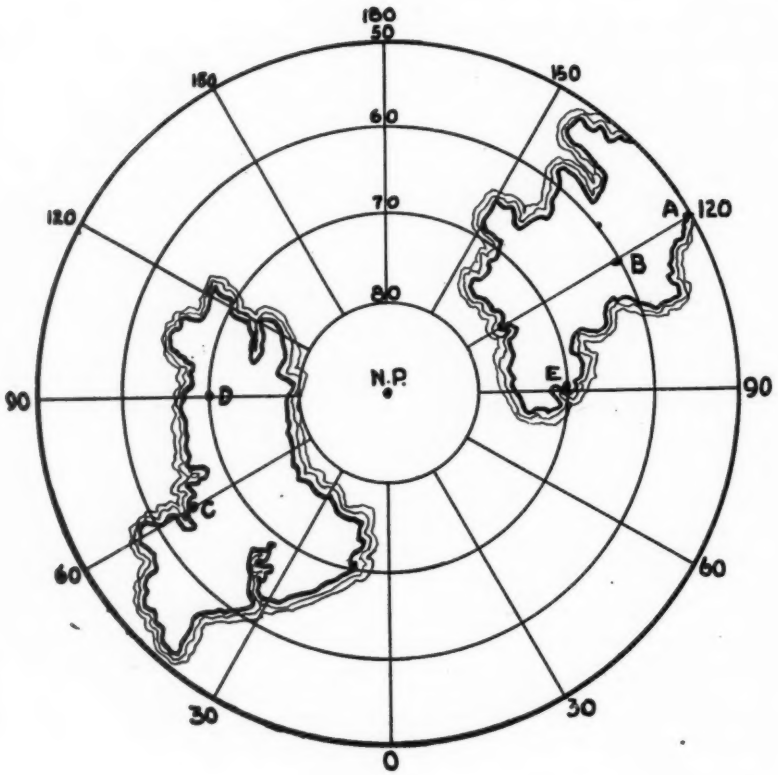
1. What projection is Map B? _____

2. What is the direction from A to B? _____

3. What is the approximate distance in miles between B and C? _____

4. What direction is D from B? _____
5. About how far in degrees is B from the North Pole? _____
6. Is this island in the eastern or western hemisphere? _____
7. Which city is closer to the South Pole D or B? _____
8. Give the latitude and longitude of B. _____
9. Is this island in the high, middle or low latitudes? _____
10. Is the great circle route between A and B
    (a) On the 77th parallel
    (b) Slightly north of the 77th parallel
    (c) Slightly south of the 77th parallel _____
11. There is a scale given with this map. Can you use it to measure the distance from A to B? Yes or No. _____
12. Please give the reason for your answer. _____
13. Is this map—a. large scale; b. small scale; c. medium scale _____
14. Suppose the numbers on the side of the map were changed as follows: 75 to 0; 76 to 1; 77 to 2; 78 to 3; 79 to 4 In such a case would there be any change in the size of the island? Yes or no. _____
15. Give the reason for your answer to No. 14. _____
16. At 77° one degree of longitude is equal to about 15 miles. What is the distance between A and B? _____
17. If there is any distortion on this type of map, which of these is most distorted? Area, shape, direction? _____

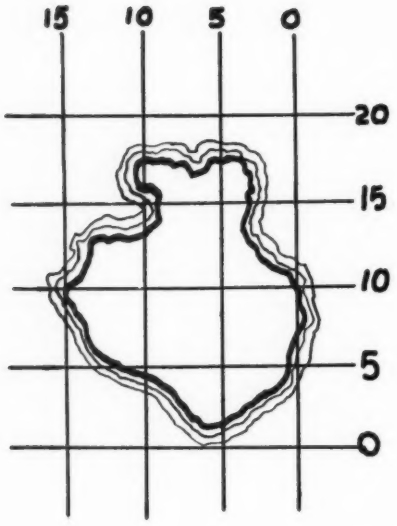
MAP C



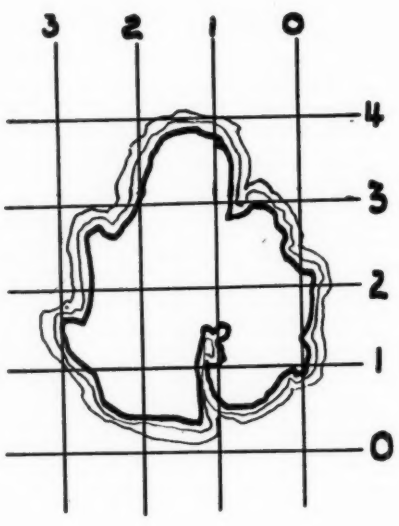
Map C

1. What projection is this? _____
2. What direction is B from A? _____
3. If you were going to ship from B to C, what direction would you sail? _____
4. Give the latitude and longitude of D. _____
5. What direction would you go in taking the shortest route from D to E? _____
6. Which of these cities are joined by a great circle over the pole: D and E or C and E? _____
7. What direction is D from C? _____
8. Are these two islands in the northern or southern hemisphere? _____
9. Which city is in the eastern hemisphere, C or B? _____
10. What is the approximate distance in miles from A to B? _____
11. Which would be the shorter distance between B and C, (a) the Great Circle route, (b) the 60th parallel? _____
12. How are meridians shown on this map? _____
13. Are these two islands in high, low or middle latitude? _____
14. Which would you say this map is:
    a. large scale
    b. small scale
    c. medium scale
15. If there is any distortion on this map, where will it be greater, at A or E? _____

A



B



1. Which map is larger scale A or B? _____

2. Which is the larger island A or B? _____

3. Here are two fractional scales:
   Indicate in the parentheses which map each fits—
   1. $\frac{1}{44{,}352{,}000}$ ( ) 2. $\frac{1}{8{,}870{,}400}$ ( )

4. If you were taking a walking trip on one of these islands which map would you prefer to use in order to have more details? _____

5. Why? _____

_____

INDUSTRIAL TRENDS IN THE PACIFIC NORTHWEST

OTIS W. FREEMAN AND H. F. RAUP
University of Indiana; U. S. Board on Geographical Names, Department of the Interior

We already are aware of some of the extensive changes in the national economy which are the outgrowth of this war, but it is too early to attempt a forecast of permanent changes. There are, however, certain industrial trends in the Pacific Northwest which may indicate permanent elements of the future geographic complex of the region.

Since the 1840's when the Oregon country shipped lumber and furs to the Sandwich Islands, and the 50's, when its sawmills provided timber for California gold-boom towns and cities, the northwestern states and territories have been known for their extractive industries, particularly lumbering, mining, and fishing. The exploitation of these and other natural resources lagged until this nation became acquainted with the Northwest at the time of the Yukon gold discoveries, when the coast cities gained wealth and population as outfitting and transportation centers for Canada- and Alaska-bound miners. Seattle, and to a lesser degree, Tacoma, Portland, and Vancouver, became thoroly cosmopolitan centers as the result of the gold rush of '98, and the beginnings of many of their varied industrial enterprises date from that period.

Industrial activity, however, remained subordinate to the shipping services which these ports had to offer. As recently as 1936, for example, professional geographers had difficulty in making a case for Seattle as an industrial center. Several woodworking plants, including furniture factories; the construction of pleasure and fishing boats; the Boeing aircraft plant; a few canneries and some naval outfitting establishments constituted a comparatively narrow base for the city's industrial life. Seattle's industrial personality was poorly defined, and available resources such as hydroelectric power were insufficiently utilized. According to the 1939 census reports, Seattle's industries centered around the production of food, transportation (exclusive of automobiles), iron and steel manufacture, chemicals, printing, cleaning, meat packing, and machinery, in the order named. There were many small industries, but most of the manufactured goods were prepared for west-coast distribution, and to meet local requirements. Seattle has been largely a wholesaling, rather than a manufacturing center. The situation is changing, how-

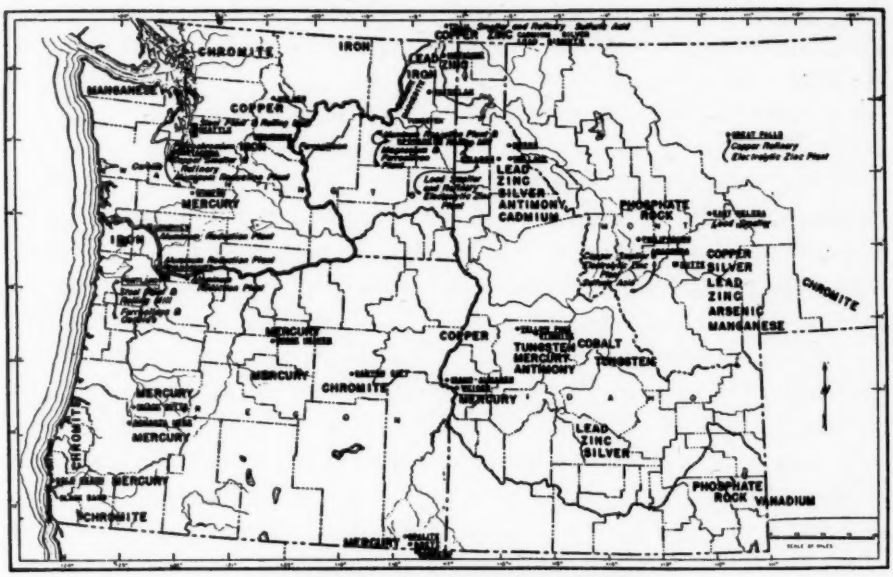
ever, and great specialization has occurred already, particularly in the field of operations of the woodworking industries, which rely upon local sources of raw material to sustain them.

LUMBER

Between 1900 and 1910, Seattle and other coast ports began to ship quantities of lumber products to the east coast. Exports of lumber mounted during the war years of 1917 and 1918, and after the completion of the Panama Canal. At first, Douglas fir was in principal demand, especially for the construction of temporary forms for concrete buildings, for which it is well adapted. In later years, white pine, cedar, and other woods entered the eastern markets. The boom in Northwest lumber production lasted thru the decade from 1920 to 1930. In 1922, the lumber center of Longview, Washington, was planned; four years later its population reached ten thousand. This rapid growth of a "company town" was indicative of the type of industrial development in the Northwest after the last war. Present-day Seattle and Portland shipbuilding plants represent some of the activity of 1917 and 1918. They may become a permanent addition to the industrial life of these cities, altho the industry was insignificant from 1919 to 1935.

It is difficult to give an adequate representation of the present importance of the forest industries of the Northwest. The region's forests are providing more than half the lumber for building American army camps and other military uses, and more than 50% of the residents of the Pacific Northwest depend on lumbering and its associated industries for their livelihood. Its forests supply the large, clear, Douglas fir logs which are peeled for the manufacture of high-grade plywood, a preferred material for packing crates, furniture, small boats, and many varied wartime uses. Recently this product has entered the field of building materials on a large scale.

Northwestern forests also produce some wood pulp for cellulose, altho this commodity is not as important in the Northwest as it is in other sections of the United States and Canada. We have barely skimmed the surface as far as development and use of cellulose is concerned. It is reasonable to expect a greatly expanded list of industrial plants making use of this important material in the manufacture of rayon, plastics, explosives, and synthetic coatings and varnishes. Other possibilities include plants which use destructive distillation of wood processes, such as the manufacture of charcoal, wood oils and tar, acetate of lime, and methyl



STRATEGIC MINERALS OF THE PACIFIC NORTHWEST

alcohol. There also is a possibility that plants engaged in rayon spinning and weaving of textiles may find it advantageous to locate in the Northwest. Research looking toward increased uses of forest products is conducted by the Western Pine Association in Portland, the Weyerhaeuser Timber Company in Longview, and at Oregon State College, the University of Idaho, and the University of Washington.

Processing of wood products is of greatest importance in Tacoma and Portland. In the former city, the value of goods produced by planing mills and sawmills was approximately equal to the value of all processing of foods in 1939. The manufacture of furniture and chemicals followed in that order. In Portland, the handling of wood products is less important than in Tacoma, and textile manufacture, iron and steel manufactures and the products of the sawmills were of about equal value in 1939, with foods, printing, furniture, and chemicals following. In Tacoma and Portland, it is apparent that increasing importance is to be expected in connection with the woodworking industries. The present tendency is directed toward greater production of finished goods.

MINERALS

Copper: Mining operations of the 80's and 90's in the Coeur d'Alene district of the Idaho panhandle added greatly to the in-

dustrial activities of the Pacific Northwest, and supplied wealth and population for the development of Spokane and other centers. A copper smelter, erected near Tacoma about 1887 was built on deep water to handle local lead ores; later it was converted to smelting copper ores shipped in by steamer from Alaska and other sources. During the last war, copper mining was stimulated in Oregon, and some copper ores were sent to the Tacoma smelter from that source. Production lagged, however, and the industry was seriously affected by the depression of the early 1930's. Washington smelters handled only 33,000 pounds of copper in 1934. By 1937, production had jumped nearly four times. Between 1937 and 1938, the figures increased ten times, from 124,442 pounds to 12,494,297 pounds. Some of this increase was the result of the opening of a new copper mine near the head of Lake Chelan, at Holden, Washington. Peak production in 1940 reached 21,000,000 pounds, and from the three northwestern states, total 1940 copper poundage was 286,000,000.[1] In that year, more than $100 million in metallic ores was extracted from the mines of Montana, Idaho, Washington, and Oregon, and a large part of this total was wealth derived from copper. British Columbia mines added another $60 million to this figure. Reliable statistics have not been released since 1940, but estimates indicate a declining output because of low prices for the metal.

Iron and Steel: Heretofore, Pacific Northwest industrial development has been handicapped by lack of many of the basic materials of manufacture, especially coal. Iron manufacture has been undeveloped, yet there are fourteen proven ore deposits, averaging higher than 60% metallic iron, within economic transportation range of the west coast. These include deposits in Alaska, British Columbia, and Idaho.[2] The lack of good coking coals has been a serious handicap to iron manufacture in this part of the country, since these are obtainable only at great distance and high cost from Crows Nest, British Columbia, and Durango, Colorado. Limestone, dolomite, magnesite, and silica rock are available in quantity. Chromite and manganese are not plentiful, but even these scarce commodities are not entirely lacking. The large supply of magnesite, which can be mined at Chewelah, in northeastern Washington, should become a distinct advantage to the iron and steel industry in the Pacific Northwest.

Iron and steel products which are manufactured a long distance from consuming markets must face competition from more conveniently located plants. In this respect, the Northwest has been

seriously handicapped, altho two small steel mills have been operating in Seattle and Portland. Long rail hauls or water hauls have been costly, and local demand was inadequate to justify the development of the industry on a major scale. The total population of the Northwest in 1940 was three and a half million, of whom fifty per cent lived in the Puget-Willamette lowlands. Since 1940, however, the large influx of wartime residents has provided a northwestern urban market of some magnitude. For example, whole new cities such as Vanport, Oregon, have been built to house the in-migrants. This city occupies 650 acres of reclaimed, diked, Columbia and Willamette river bottoms. Its construction was begun in September, 1942. It was completed in January, 1943, and now claims to be the second largest city in Oregon, with 10,000 living units, three fire stations, a shopping center, library, hospital, clinic, and complete school system.

This mushroom growth is the outcome of a need for living accommodations for shipyard workers in nearby Portland and for metals plants in Vancouver. If present conditions continue, the northwestern iron and steel industry will have a ready-made consuming market close at hand, as well as access to oriental and west coast markets. The former disadvantage of lack of skilled labor in heavy industries will be overcome by the influx of many laborers who are engaged in shipbuilding.

Light metals: aluminum and magnesium. Expansion of light-metals manufacture, especially aluminum, has occurred since the completion of the Columbia River dams, and five smelter plants have been established. Aluminum rolling mills in the Spokane Valley and elsewhere in the Northwest will make possible the elimination of three transcontinental trips for aluminum used by northwestern aircraft manufacturers. It will no longer be necessary to ship bauxite from the Gulf Coast to Vancouver, then to the east coast for rolling, and return the finished product to Seattle for airplane construction. Production of aluminum in the Northwest will soon reach 600 million pounds annually, or more than 150% of the entire United States output in 1940. Present indications (January, 1944) are that the limit of expansion has been reached. Attempts to obtain the raw material from local sources are under way, and it is planned to produce aluminum from clays near Mollala, Oregon, and Castle Rock, Washington. Igneous rocks on Cypress Island in Puget Sound and near Mt. Baker may become sources of aluminum. The production of aluminum from northwestern clays is one of the problems to be undertaken by the new

minerals laboratory under construction at Albany, Oregon.

Magnesium is the latest metal to attain large-scale production in the Northwest, a plant at Spokane using electrical methods to extract the metal from dolomite obtained in northeastern Washington. With enormous reserves of magnesium ore and quantities of cheap electric power, the electrolytic smelting of magnesium will probably be expanded in the Pacific Northwest. The metal can be substituted freely for most uses of aluminum.

Other metals: Among the heavier metals, the Northwest has come into prominence during the past year because of the exploitation of the ore of antimony, at a new town named Stibnite, in Idaho. The production from this source will partly offset the loss of our foreign sources of antimony.

Lead and zinc mining, of course, is a long-established industry in this part of the nation, with Idaho second only to Missouri in importance of lead extraction. Oregon follows California in quicksilver production, with twenty-three known producing centers in 1942. Of these, the Bonanza mine in Douglas County is the largest producer in the United States. Oregon produced only 1,342 flasks of mercury in 1933; in 1941, more than 9,000 flasks were produced. Minor metals include the preparation of bismuth, arsenic, cadmium, and platinum. Oregon's first manganese plant began operations in Curry County in 1941, and zinc mining began the same year, with some commercial production of the commodity in 1942. In northwestern Washington, manganese ores of the Olympic Peninsula are being produced. There is the possibility of smelting manganese by electrical processes, and if this can be done, pure manganese to be used for new light alloys with aluminum and magnesium will be available.

Chromium: Chromite production in Oregon began during the last war, but ended in 1918. Recently it has been revived, and prospects are good that it will become a permanent mining activity. It is also obtained in Montana, where low-grade deposits are being developed by the Anaconda Copper interests with the aid of government financing. This is an excellent example of mining projects undertaken jointly by federal authority and private interest. It may represent the trend of future mining activity in this country. Several other co-operative enterprises involving government funds and corporative skill and management have been tried in the manganese projects of the Olympic Peninsula, in southwestern Oregon chrome ore mines, and in northwestern Montana for various metals, including antimony.

HYDROELECTRIC POWER

Much of the recent industrial development of the Northwest is built around power which is derived from the hydroelectric installations at Coulee and Bonneville dams, and some dams of smaller size in other sections. Two-fifths of the potential water-power of the United States is in the Pacific Northwest, and in 1940, half of this had been developed.[3] The increased utilization of this resource has made possible an industrial expansion of major proportions. It has, in part, made possible the use of the electric furnace in place of the blast furnace in reducing iron ores; this in turn has brought about a more efficient use of scrap iron in the manufacturing processes, eliminating the need for importing large quantities of coke and crude ore. It is especially important in aluminum and magnesium manufacture. Expansion of hydroelectric power facilities to utilize the complete resource is now under way.

TRANSPORTATION

Partly offsetting disadvantages of inadequate markets, insufficient labor, distance to consumers, shortages of coking coal and the like, the Northwest has some pronounced advantages. These include excellent rail transportation, with some opportunity for water transportation far inland. Railways are numerous and serve the region well in spite of the mountainous character of much of the terrain and the lack of low mountain passes over the Cascades. Fortunately the Columbia River Gorge provides a transportation corridor thru which raw materials may be shipped far inland almost at tide-water levels. This break in the Cascade Range has been made still more useful by the deepening of the Columbia and Willamette river channels to permit ocean vessels to reach Portland, 100 miles from the open sea. Extension of this deep-water navigation will shortly reach The Dalles, 188 miles inland up the Columbia River.

THE DISTRIBUTIONAL PATTERN OF INDUSTRY

The developments which have just been described are widely scattered. Greatest activity in forestry is found in the Douglas fir area of the Cascades region of Oregon, and northward into the mountains of Washington. Northern Idaho, the Montana Rockies, and the Blue Mountains district of Oregon comprise the second great lumbering center. Mining activities are more widespread, but the greatest wealth and variety of minerals is obtained from

three sections of the northern Rockies: the Butte district, with copper, zinc, and numerous mineral by-products; the Coeur d'Alene district of Idaho and nearby deposits of northeastern Washington, producing copper, silver, lead, and zinc; and the Stibnite district of Idaho, with antimony and tungsten. In the Cascade Mountains area, coal and some copper, mercury, and chromite are mined. Aluminum processing is widely dispersed, but of necessity it is within reach of plentiful supplies of hydroelectric power.

In the future it is probable that many northwestern industries will tend to concentrate west of the Cascades, where both rail and water transportation are available. This tendency to locate within reach of the coast ports is normal, because in future, the Northwest must seek an outlet for much of its manufactured goods, and of all cities on the Pacific Coast, Seattle, Tacoma, and Portland are most favorably situated for developing oriental trade since they are nearer by water than any other continental United States ports. This single advantage goes far to offset some of the disadvantages of the region.

INDUSTRIAL TRENDS

From this distributional pattern, the northwestern industrial picture is emerging. At present, certain centers of activity can be noted. First, as previously discussed, industrial activities of the coastal ports have been greatly stimulated. This is especially true of Seattle, where aircraft manufacture and shipyard construction have almost erased the city's traditional role as a commercial and shipping center. Tacoma is experiencing a somewhat similar change, but more directly along lines of smelting and metal processing. Tacoma is a city of diversified manufactures, and also is important for both wholesale and retail trade, but additional aspects of manufacture of raw materials are apparent now.

In eastern Washington, Spokane's principal activity since its founding has been concerned with transportation, and it has served as an important distributing point for goods thru its hinterland—the "Inland Empire"—since the 80's. As a distribution center, its industries have been related to meat packing, flour milling, paper manufactures, brewing, and the products of planing mills. This is the Spokane industrial complex as it appeared in the 1939 census figures. But since 1940, Spokane has acquired aluminum and magnesium plants, a rolling mill for processing metals; two military supply depots, a military hospital, and an air field. For the

time being, at least, the importance of transportation activities in Spokane is diminished relatively, and it will be interesting to note whether this is a permanent tendency or whether it will end at the close of the war. If it becomes permanent, the entire character of human economy in the city of Spokane may undergo a complete change.

The greatest change has come to the Portland-Vancouver area, where there is ready access to power from Bonneville Dam. A great variety of enterprises—shipyards, lumber mills, aluminum plants—has made this an important industrial conurbation, with an industrial base of greater diversity than in other parts of the Northwest. There are indications that the whole lower Columbia River valley, for a distance of two hundred miles inland, may become strongly industrialized in the near future, because of its resources in water power, navigation, railway communications, and other advantages. Former agricultural communities, such as Richland, Washington, are being completely displaced by industrial centers. Richland's industrial development is closely allied to war activities: the production of chemicals, explosives, and various compounds. In the Northwest, large amounts of electric power are at hand for the manufacture of synthetic nitrogen compounds, used extensively in explosives. Other necessary materials such as sulphuric acid, cellulose, glycerine, and grain alcohol are obtainable locally.

It is apparent from this brief description that the Pacific Northwest is in process of change from a narrow economy based upon the extraction of raw materials, to a more advanced economic condition in which a wider use of raw materials and more complete processing will be developed. We quote directly from the report of the National Resources Planning Board, published in 1942:

"An inventory of the region's natural resources shows that there are definite possibilities of further development that would provide a livelihood for a considerably larger population. There is a resource base broad and strong enough, if wisely used, to permit a very considerable expansion of industrial activity and a material expansion in agricultural land development and settlement. However, the mere existence of an adequate resource base does not automatically bring about economic expansion. Markets for the additional goods and services that might be produced must be available; the means to realize the possibilities of expansion at hand."

With the rapid depletion of timber and ore reserves under

wartime pressure, this principal resource will be lost to the Northwest and there will be nothing to replace the extractive industry unless constructive measures are taken to prevent it. Inevitably, as the forests are cut and the mines worked out, Northwest industry must turn to increased use of waste wood products and more complete processing of lumber, as well as development of inferior ores, if the present population is employed. The tendency, therefore, lies in the direction of a greater degree of industrial self-sufficiency. The established extractive industries must shift their base of operations, seeking and utilizing new raw materials and carrying out the processing of those materials to a greater extent than they are now doing. It is hoped that this advance will be accomplished without experiencing some of the evils of industrialization, such as poor housing, overcrowding, blighted urban areas, and inadequate transportation facilities, which have been associated with industry in the eastern United States.

Some efforts at coordination of activities in the Northwest have been made already by various organizations, including the Northwest Regional Planning Council, the National Resources Planning Board, the Bonneville Power Administration, the Bureau of Reclamation of the Department of the Interior, and others. In future, it would seem that this part of the nation will have a considerable degree of unified development, stemming largely from its essential geographic unity as a single major drainage basin, with its core area in the Willamette Valley and Puget Lowland, and some outlying centers where resources and power are available. Few parts of the nation lend themselves to unified regional industrial enterprise as readily as the Pacific Northwest. It is our observation that the people of that section are well aware of its geographic unity, and within the next few years their attitude should advance their industrial position.

NOTES

The map is reproduced from *Northwest Science,* August, 1943.

This paper was presented at the meeting of the Association of American Geographers, held in Washington, D.C., September, 1943.

1. The Mineral Industry during 1941, edited by E. B. Roush, p. 136.
2. E. T. Hodge, Report on available raw materials for a Pacific Coast iron industry. War Department, Corps of Engineers, U. S. Army, North Pacific Division, 1935, pp. c-d-e.
3. A. L. Seeman, in Freeman and Martin, The Pacific Northwest, New York, 1942, p. 240.

THE MUSKRAT FUR INDUSTRY OF LOUISIANA

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So common is the wearing of fur coats today that we are likely to forget the importance of the fur industry in the early settlement of our country. Fur trappers and traders aided materially in the early discovery of much of the land in search of furs for the old world. The settlement of the lands led to a decline in the fur animal population due to destruction of forests and other forms of natural protection. The invention of the steel trap resulted in such a rapid decrease in the number of fur bearing animals that the Federal and State governments were compelled to enact laws to regulate the trapping of animals and to prevent the extinction of many of the species.

A number of years ago, it was discovered that the pelt of the muskrat could become a valuable source of fur. It was also discovered that the muskrat lived in large numbers in the marsh area of South Louisiana and that the fur of the Louisiana muskrat was more valuable for fur than the muskrat furs of some areas further north. As a result of these discoveries, the marsh lands, which were considered almost valueless and were used only for grazing purposes, became more valuable. As the trapping of the muskrats gradually developed into an industry, certain regulatory measures were put in force by the State of Louisiana which provided for a trapping season, and a certain code regulating the trapping. The muskrat industry has enabled Louisiana to lead the United States as a fur producer. More will be said of this later.

So important has the industry become that it gives employment to approximately twenty thousand trappers each season and furnishes a living in one way or another to at least one hundred thousand people according to Armand P. Daspit, Director of the Fur Division of the Department of Conservation.

From the map (Fig. 1) showing the muskrat distribution you will observe that the muskrat lives in an area extending from Newfoundland to Alaska and from Florida to California. Even tho it is distributed over this wide area, it seems to find the marsh area of South Louisiana best suited for its maximum development and the catch from this limited area has accounted for over forty-seven per cent of the muskrat fur production of the United States and Alaska in 1939-40. The accompanying map (Fig.

2) of South Louisiana shows the areal distribution of the trapping industry.

The muskrat of Louisiana is said to form a distinct species known scientifically as *Ondatra zibethicus rivalicius* (Bangs). It is

Fig. 1. Muskrat areas of North America.

a compactly built little animal with an average body length of twelve inches and a tail length of ten inches. The head is relatively wide with round ears that protrude above the fur. The eyes are small, bright and beady. The body is covered with a soft under fur, interspersed with long, stiff, glistening guard hairs which overlie and practically conceal the fur on the upper surface

Fig. 2. An outline map of the southern part of Louisiana showing, in the shaded sections, the coastal marsh area which is the natural habitat of the Louisiana muskrat, this fur-bearer being found in no other part of the State.

and sides of the body. The guard hairs prevent the fur from matting or felting. The color of the muskrat is a dark brownish black, with reddish or golden tints on the sides and white silver belly. The animal is a prolific breeder, producing from three to five litters in a year with an average of four kits to a litter.

HABITS OF MUSKRAT

On the general habits of the Louisiana muskrat, Vernon Bailey reported his observations as follows:

"In habits, the Louisiana species differs from other muskrats only in adaptation to unusual environmental and climatic conditions. On the rather dry marshes they dig for water and food and have acquired almost the burrowing ability of pocket gophers. Many of their burrows do not reach water, but merely extend under the tough sod for long distances among the roots of the sedges, grasses, canes, and cattails, on which they feed. At times of heavy rains or high tides these burrows usually fill with water, but at other times they stand dry or merely moist and muddy. When the burrows are made the ground is often dry, but the muskrats burrow indifferently thru dry or wet ground, both in search of food and as a means of safe travel from place to place, and even of communication between neighboring houses.

"In walking over the marshes one is constantly caving into or feeling the give of these burrows below the sod. In places the marshes are honeycombed with them. The burrows open out to the surfaces in numerous places under cover of the tall grass or sedges, and some of these doors are regular feeding spots where the grass or sedges are cut and eaten, or roots brought up to be eaten. Other opening are used in bringing out mud for plastering up the houses, and still others are exits to cool beds of grass or sod under a dense cover of vegetation, which, at least in summer, take the place of houses.

"In many cases the burrows are closed from within and definitely plugged with mud or turf to keep out light and enemies, but this habit has not become so firmly fixed as in the pocket gophers and many other rodents. The burrows opening into the light, or exposed places are more often closed than those under a good cover of grass."

MUSKRAT HOUSES

Muskrat houses or hills are characteristic of the coastal marsh. The houses are built of marsh vegetation, which can be most

Fig. 3. Muskrat home in the marshes of Louisiana. Picture illustrates destruction of muskrat food plants by wild geese in certain areas. Photograph by Ted O'Neil, Biologist, State Department of Conservation.

easily secured, and mud. These houses rise from two to four feet above the marsh with a basal diameter of usually four to six feet. The entrance is always below the surface of the ground. If the house is built in a low spot and is surrounded by water, the tunnels are filled with water and the muskrat has to swim in the subway entrance into his house. These tunnels are many feet in length. Sometimes there are as many as five or six tunnels leading into the house which radiate from it, similar to spokes of a wheel. Inside of the house, the muskrat constructs a platform above the water level on which it rests during the day. The thick walls of the house protect the muskrat from enemies as well as the cold in winter and the heat in summer.

The muskrats are largely vegetable feeders altho they will eat some animal matter. Mr. Ted O'Neil of the Biological Division of the Department of Conservation states that snails and fresh water clams form a seemingly necessary part of the diet. They feed

largely on the root systems of a variety of plants growing in the marsh area. The three-square club rushes are the plants most desired, the three-square (*Scirpus roburtus*), the bayonet three-square (*Scirpus olneyi*) (Gray).

The geese which spend the winters in the South also feed on these plants. At times they concentrate in certain of the muskrat trapping areas in such numbers that the food plants on which the muskrat feeds are destroyed and the rats are forced to migrate. The picture of a muskrat house (Fig. 3) shows an area where the geese have destroyed the food plants, exposing the muskrat home to full view.

Abundant food and the right amount of water do not furnish all the requirements for the maximum development of the muskrats. According to the field force of the Department of Conservation, it is necessary for a thick layer of peaty humus to cover the marsh lands for the muskrats to exist in the greatest numbers. The peaty humus is seventeen feet thick in one area having a very dense rat population.

Enemies of the Muskrat

The muskrat has many enemies. The enemies ranked according to the destruction they cause are as follows: minks, moccasins, snakes, garfish, owls, hogs, alligators, and raccoons.

The minks seem to prefer to burrow into the top of the muskrat home to destroy the kits. The moccasins attack the young muskrats when they come out of their home to feed. The garfish catches the muskrats when they venture into the shallow water of sufficient depth to enable the fish to swim. As the muskrats are nocturnal in habits, certain owls tear holes in the pelts of the dead trapped muskrats. Wild hogs do much damage in rooting or tearing into the muskrat homes and destroying the young muskrats. Some of the field biologists do not think the alligator is as destructive as claimed by many, altho alligator stomach contents show that they destroy many rats. The chief damage done by the raccoon is in destroying the young of the muskrat.

Other destructive enemies of the muskrat are periodic drouths which force the muskrats from their feeding areas, and floods, especially those which force the muskrat from their homes and cause the destruction of the young by exposure and in being destroyed by snakes and other enemies.

CONSERVATION OF MUSKRATS

Where muskrats are not trapped and where their natural enemies have been destroyed, they multiply so fast that their increased numbers destroy the food plants to such an extent that they lack food. With the growing scarcity of food, the quality of the fur greatly diminishes and as a result, the soft under fur fails to develop perfectly or not at all. The animals become more subject to disease, many may starve or be forced to migrate to new areas. It has been found by the conservation field force that regulated trapping is a great aid to the muskrat industry in that the number of muskrats remains more constant and the food supply is conserved. In spite of the trapping, the number of muskrats becomes so great in certain limited areas that the three-cornered grass is almost entirely destroyed. Where this occurs, sufficient time has to elapse before the grass is re-established, as a whole plant cycle must be run before the conditions become favorable again for growing of the food plants. The re-establishment of the natural food plants artificially is rather difficult and slow.

TRAPPING THE MUSKRAT

The trapping season usually opens November 20 and extends to February 1. Only residents of Louisiana are permitted to trap. The trappers must pay $2.00 for a trapper's license each year. The trapper's investment necessary for the trapping season varies from one to two or more thousand dollars. It consists of a lugger type of gasoline boat, several pirogues (long narrow boats used for running trap lines), a large number of steel traps (two hundred and fifty traps may be set at one time), steel wire bent in shape of a U for stretching the pelt, knives for skinning muskrats, a tub and clothes wringer for removing flesh from skin, a screened house (Fig. 4) or shack in the marsh with household equipment such as a stove, beds, tables, chairs, and the like.

The trappers own some of the land on which they trap, but in many instances they trap on shares, usually receiving fifty per cent of the furs, but where muskrats are scarce, they receive a higher percentage of the furs. In recent years, much of the marsh land is owned by large corporations, and a few individuals secure the trapping privileges from the corporations and in turn sublease the land to trappers.

During the trapping season, the trapper usually moves his

family from the town home, to their shack or house in the marsh a few days before the opening of the trapping season in order that he may open ditches thru the marsh to be traveled by him in his pirogue in running his trap line. On the opening of the season, he takes his traps over his area, sets them beneath the water and awaits results. No trap is allowed closer than ten feet from

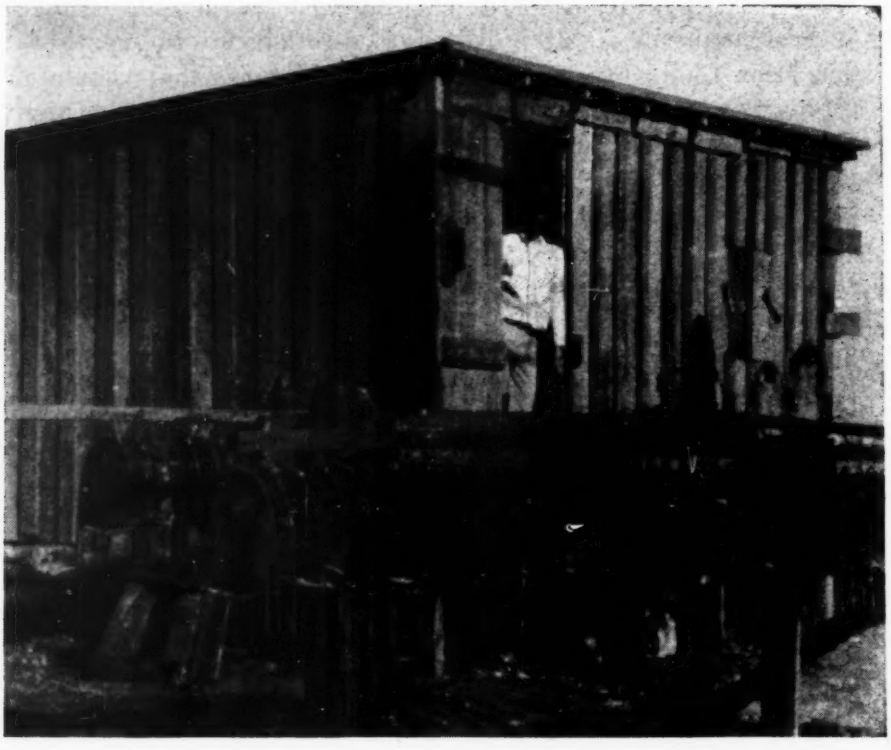

Fig. 4. A shack in the marsh, typical of those occupied during the trapping season.

the muskrat houses. Each day the trapper runs his traps and removes the rats. After they are skinned, the pelts are run thru the wringer with the fur side next to the rolls, after which they are stretched over the wire stretcher and hung up for drying.

After a few days they have dried sufficiently to be removed from the stretchers and placed inside to await the arrival of the fur buyers.

The fur buyers have their headquarters in New Orleans or in one of the large towns in South Louisiana. They buy the furs according to grade and this depends upon the size of the rat and

the distribution and quality of the soft under fur. The buyer places the furs of the same grade together and bales them for shipment, usually to New York.

By examining the statistical data covering a number of years, it will be noted that the number of muskrats caught yearly varies from approximately two to ten million and that a variation in

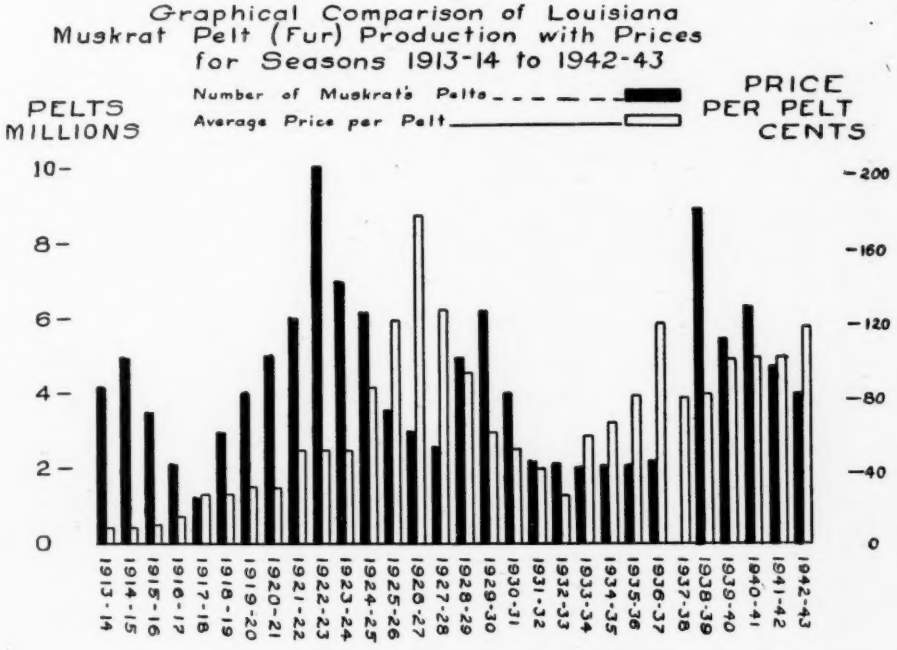

Fig. 5. Muskrat pelt production and prices.

prices occurs. Price fluctuations do not correspond with the law of supply and demand as artificial manipulation is noticeable at times, as shown by graphical representations of the yearly price and catch (Fig. 5).

What becomes of the muskrat furs? Upon reaching the great central markets, the furs are tanned and used in the manufacture of fur clothing apparel, principally for women. The manufactured fur may be sold under the name of Hudson Seal after it has been specially treated to imitate a sealskin by plucking the coarse guard hairs and clipping the soft under fur so as to present an even surface. About seventy-five to ninety muskrat furs are required to make an average fur coat for women.

Two additional possible sources of income to the muskrat trap-

Season	Muskrats caught (Number)	Average price per pelt (Dollars)	Total Value (Dollars)
1913-14	4,284,000	0.08	342,720
1914-15	5,000,000	0.08	400,000
1915-16	3,500,000	0.09	280,000
1916-17	2,125,000	0.15	318,750
1917-18	1,387,220	0.25	346,805
1918-19	2,963,110	0.25	740,777
1919-20	4,073,200	0.29	1,181,228
1920-21	4,990,000	0.32	1,596,800
1921-22	6,000,000	0.50	3,000,000
1922-23	10,000,000	0.50	5,000,000
1923-24	7,000,000	0.50	4,500,000
1924-25	6,236,165	0.83	5,176,017
1925-26	3,513,765	1.20	4,216,518
1926-27	3,036,740	1.75	5,314,295
1927-28	2,585,834	1.25	3,232,292
1928-29	5,092,699	0.92	4,685,283
1929-30	6,269,556	0.60	3,761,734
1930-31	4,068,114	0.50	2,034,057
1931-32	2,209,382	0.40	883,753
1932-33	2,150,915	0.26	559,238
1933-34	2,025,915	0.58	1,175,031
1934-35	2,125,720	0.65	1,381,718
1935-36	2,100,550	0.80	1,680,440
1936-37	2,200,520	1.19	2,618,619
1937-38	(No data for year—Buyer opposition)	0.80	—
1938-39	9,000,000	0.80	7,200,000
1939-40	5,500,000	1.00	5,500,000
1940-41	6,439,000	1.00	6,439,000
1941-42	4,834,706	1.00	4,834,619
1942-43	4,076,785	1.18	4,790,606

Source: State Department of Conservation of Louisiana.

per appear to be on the verge of being realized. One source is from the sale of muskrat carcasses for meat, and the other is from the collection of the musk glands of the male muskrat for sale as a source of musk to the perfume manufacturer.

For the past fifty years the muskrat carcass has been sold in Maryland as a source of meat under the trade name of Marsh Hare. (Gowanloch, *Louisiana Conservationist,* April issue, 1943.) Due to the shortage of meat resulting from the war, the Louisiana Department of Conservation sponsored a movement to popularize the muskrat carcass as a source of palatable and nutritious meat. Publicity was gained thru the press in which pictures were shown and descriptions given of the muskrat suppers in which the musk-

rat meat was the feature on the menu. So far the use of the muskrat as a source of meat is mostly on paper in Louisiana. Plans have been made for the collection of the carcasses and their proper refrigeration pending their disposal thru the markets for this coming season. Should war conditions continue and a strong demand for the meat develop, it seems possible that hundreds of thousands and even a million carcasses could be prepared for market.

Prior to the war, the musk deer of the Orient supplied the musk for the perfume trade. As this source has been cut, tests of the musk gland of the muskrat as a suitable source of musk for the trade were made by Dr. J. E. Erickson of Louisiana State University. They were found to be a suitable substitute. Plans were put in operation with the co-operation of a number of trappers for the collection and preservation of the glands in formaldehyde. Forty gallons of glands were collected this past season. A change was made in the skinning of the muskrat in order to save the glands which adds about five cents to the value of the pelt besides securing the income from the glands. If the trappers continue to save the glands another year it seems reasonable to predict that this side industry will become well established (Ted O'Neil, Biologist for the Department of Conservation).

From present indications, it seems fair to predict that the marsh lands of South Louisiana will continue to be used for the production of muskrat furs as fur coats are increasing in popularity even in the subtropical south. It would be difficult to find a more profitable use of the extensive and almost uninhabitable marsh lands along the Gulf Coast of Louisiana.

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1944 MEETING OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

The twenty-ninth annual meeting of the National Council of Geography Teachers will be held in Cleveland on September 10 to 12. The Association of American Geographers will meet on September 11 to 13 and the American Association for the Advancement of Science will meet during the week of September 11-16 in the same city.

Mr. Sam Woodley, Assistant Secretary of the A.A.A.S., in a letter of April 4, informs me that details about lecture rooms and hotel headquarters for the various organizations have not been completed to date. Therefore, if members of the National Council who expect to attend our meeting will write to me, I will send them detailed information about where our programs will be held, in what hotel our headquarters will be located, prices of rooms, etc., as soon as this information is available.

Both Professor Brown and I have requested that our two organizations be housed close together and in the same hotel if possible.

All geographers will be happy to hear that the address of Dr. Isaiah Bowman, retiring president of the A.A.A.S., will be delivered in the Cleveland Auditorium on Monday evening, September 11.

According to tentative plans, a joint session of the National Council of Geography Teachers and The Association of American Geographers will be held on Monday afternoon, September 11. A suggested theme for the joint session is "Planning for a Postwar Training in Geography." The number of speakers will be limited to allow ample time for discussion and an early adjournment in order to reach the Auditorium for President Bowman's address. September 11 should be a red-letter day in geographical science.

The annual N.C.G.T. banquet will be held on Tuesday evening, September 12. Tickets for the banquet must be bought before 6 P.M. on Monday, September 11. Rationing does not permit late buying of tickets or refunds. Please buy your banquet tickets when you register.

Our first business meeting will be held on September 10. If there is any matter which any member would like to have presented, please, send your item or problem to President Cunningham or myself. However, you need not wait until September. If you have a suggestion or problem, present it to one of us now and we will give it our personal attention. Moreover, we will refer your corre-

spondence to the chairman of a standing committee if one exists on the problem involved. Of course you should feel free to write directly to the chairman. A mailing list of Committee chairmen and our Board of Directors is at the end of this notice.

In spite of the war there are many reasons why our organization should meet this year. It is difficult to hold an organization together and have it function properly without personal meetings of its officers, board of directors, and committee personnel. We need to elect officers and appoint new committee members. We need to hear and discuss Standing Committee reports. We need to discuss our problems, re-examine and redirect present programs as well as initiate new ones.

If the N.C.G.T. is really to function in planning the role which geography will occupy in the postwar period of American education, then a meeting of our organization should be nearly mandatory. Numerous problems demand our attention. If we do not meet and solve our teaching problems, some other organization will be called upon to do our work.

It is true that professionally trained geographers have been called upon to perform numerous special and general tasks. Therefore, if possible, every member and officer of our organization should attend the Cleveland meeting. The problems of geographic education facing our organization are numerous and large. We need your help.

If you have not already received our mimeographed bulletin entitled, "The National Council of Geography Teachers as a Working Organization" and wish a copy, please, mail your request to me.

Standing Committees and Chairman

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Distinguished Service Award	Prof. S. S. Visher, University of Indiana, Bloomington
High School Curriculum	Prof. Henry Becker, Florida State College for Women, Tallahassee
Local Survey	Prof. L. C. Davis, State Teachers College, Indiana, Pa.
Membership	Mrs. Katheryne Thomas Whittemore, State Teachers College, Buffalo, New York
Publications	Miss Alison Aitchison, Iowa State Teachers College, Cedar Falls
Public Relations	Director D. J. Swartz, 899 Tenth Ave., New York City 19
Research	Miss Edith Parker, University of Chicago
Standards on Certification	Dr. A. H. Meyer, Valparaiso University, Valparaiso, Indiana
Tests	Miss Marguerite Uttley, Iowa State Teachers College, Cedar Falls

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NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

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THOMAS F. BARTON, *Secretary*

EDITORIAL NOTES AND NEWS

Reports reveal that about two and a fourth billion barrels of petroleum were produced in 1943. The United States accounted for about one and a half billion barrels of this, and the U.S.S.R. and Venezuela each produced about a quarter billion barrels. Iran ranked fourth. States rated according to production were Texas, California, Louisiana, Oklahoma, Kansas, and Illinois. Since the demand is for increased production in 1944, attention is focused on greater domestic and foreign production. Prospects indicate a possibility that Venezuela may yield a million gallons daily. A proposed pipeline across Saudi Arabia is proving highly controversial. Such a pipeline would distribute petroleum from the Persian Gulf to a terminal on the Mediterranean, maybe Haifa or Jaffa in Palestine.

Some of our most vital war equipment would have been impossible, or at least dangerously behind its 1943 level, had it not been for the priorities given to fly certain strategic and critical raw materials from India, Africa, Australia, Latin America, and China. Included among these imports are mica, quartz crystals, tantalite, beryllium, industrial diamonds, and rare drugs. Illustration of the size of air cargo and distance flown is the recent record flight of the Mars which flew nonstop from Patuxent, Md., to Natal, Brazil, 4,300 miles in 28 hours and 25 minutes with a load of 148,500 pounds. The longest air-cargo route flown on schedule is reported to be the one from Ohio to India. It carries war essentials to our armed forces.

The Development Corporation of Chile, somewhat similar in functioning to our Reconstruction Finance Corporation, announces a nation-wide electrification program. Hydrogenerating stations are to be set up in seven areas and a network of distribution lines and sub-stations are to tie the nation into one coordinated power system. It is hoped to use this power in mines, smelters, other industries, and to electrify the railroads; also for domestic purposes, and to extend irrigation, especially in the arid north where subsurface water is thought to be available thru the use of electric pumps. The per capita potential of hydroelectric power is reputed to compare favorably with that of Norway. Chile is peculiarly favored for this development because of its numerous rivers descending headlong toward the sea from the snow-covered mountains.

Reports indicate that the Norman Wells oilfield has a much larger reserve than was first anticipated. The Canol pipeline from this oilfield to Whitehorse was reported completed this winter and the refinery at Whitehorse is supposed to be ready in May. The daily capacity of the pipeline and refinery is rated to be 3,000 barrels.

According to a recent announcement from the Department of Interior, more than 88,000,000 barrels of crude oil were transported in the 24-inch pipeline from Texas to the East Coast during its first year of operation. That is equivalent to the quantity that could be hauled in a fleet of 18,000 tank cars operating on a 7-day week schedule.

One of the largest and best-equipped airports in the world is being built on a site adjoining the present Mexico City air field. It will have five main runways more than a mile long. These long runways are an adjustment to the rarified atmosphere which makes longer take-offs necessary than at low altitudes. Drainage problems due to the flatness of the site are being solved. All known facilities are to be provided for the comfort, convenience, and health of passengers, and for keeping them moving as quickly as possible in and out of the airport. There will be meteorological and radio stations, shops for repairing and servicing planes, and mammoth turntables for swinging transport ships

around and sending them on their way as fast as possible. Whatever experts in airport construction in the United States have found to provide safety and expediency is to be incorporated in this airfield which is now named Aeropuerto Central.

Public and private interests in greater petroleum production are encouraging the drilling of wildcat wells. Wildcats are wells driven in places where oil is suspected but has not been proven to exist. As it costs from $10,000 to $40,000 or more to drill a well, it is not surprising that wildcatting declined. Some believe that an increase in the price of crude oil will stimulate more prospecting for oil. In the meantime it is encouraging to note that there is less risk in encountering dry wells due to methods and instruments used to ascertain as many facts as possible about the underlying rocks of various levels. These methods and instruments include gravity tests, seismographs, and electrical resistance. That they are helpful is indicated by the fact that the chance of getting a dry well is reported to be about one-quarter the risk it formerly was.

GEOGRAPHICAL PUBLICATIONS

Russell H. Fifield and G. Etzel Pearcy. **Geopolitics in Principle and Practice.** 204 pp., maps, append., index. Ginn and Company, 1944.

This book is quite unsuitable as a text for A. S. T., Term III, despite advertisements of the usually reliable publishers. Army Service Manual M103-1, which presumably reflects the wishes of the authorities, contains no geopolitical words or thoughts; rather is it a straight-forward analysis of national states (Political Geography).

Part I of Fifield and Pearcy, in startling contrast, contains brief statements of geopolitical definitions, scope, evolution, and "prime factors;" Part II, consisting of ten chapters, deals with the "geopolitics" of this or that state. Neither part represents maturity in the study of geopolitik, altho the authors have been successful, perhaps beyond their intent, in transferring to new pages the muddy thought that pervades the writings of Haushofer and his henchmen.

The chapters are not only shallow in geopolitical theory and application; they are marred by errors of fact too numerous to mention. Two examples of errata are: "the only country in the world that can possibly compare with the United States in resources of iron ore is the Soviet Union," and "the Cotton Belt of the United States is the largest area in the world that is suited for the production of this valuable cash crop." Perhaps the least objectionable feature of this book as a text is its poor organization.

The A. S. T. detachments, as this reviewer has come to know them at a typical institution, include as fine a group of young men as were ever assembled in an American classroom. Geographers can ill-afford to give them anything less than the best. And whether military or civilian, the college classroom is no place for the airing of propaganda or for toying with half-truths or for the presentation of distorted views of the world lifted from the pages of unprincipled writers.

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